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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,556	06/27/2006	Hee-Woo Rhee	034225.002	1862
441 7590 06/07/2010 SMITH, GAMBRELL & RUSSELL 1130 CONNECTICUT AVENUE, N.W., SUITE 1130 WASHINGTON, DC 20036			EXAMINER APICELLA, KARIE O	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 06/07/2010	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/564,556

Applicant(s)

RHEE ET AL.

Examiner

Karie O'Neill Apicella

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2 and 5-10 is/are pending in the application.
- 4a) Of the above claim(s) 7 and 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5, 6, 9 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The Applicant's amendment filed on March 1, 2010, was received. Claims 1, 5, 7 and 9 have been amended. Claims 3 and 4 have been cancelled. Claims 7 and 8 have been withdrawn from consideration. Therefore, Claims 1, 2, 5, 6, 9 and 10 are pending in this office action.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on September 29, 2009.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 1, 2, 5, 6, 9 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear if the "ionomer/solid proton conductor" material is an "ionomer", which can have polymeric liquid-type properties, or a "solid proton conductor", which would have solid-type properties, or if it is a combination of an "ionomer" material and a "solid proton conductor" material.

Claim Rejections - 35 USC § 103

5. Claims 1-2, 5-6 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hennige et al. (US 2004/0038105 A1).

Hennige et al. discloses a proton-conducting membrane for use in the membrane electrode assembly of a fuel cell (paragraphs 0101-0102) having a thickness of less than 200 μ m, more preferably 100 μ m, and with very particular preference of less than 5 or 20 μ m (paragraph 0035). Hennige et al. discloses wherein the proton-conducting membrane is a composite material comprising at least one organic and/or inorganic material that has ion-conducting properties dispersed in a polyelectrolyte or polymer solution (paragraphs 0030-0035 and 0050). Hennige et al. discloses the ion-conducting material is at least one compound selected from phosphates, phosphides, phosphonates, sulfates, sulfonates, sulfoarylphosphonates, and mixtures of these compounds, with least one of the elements Al, Si, P, Sn, Sb, K, Na, Ti, Fe, Zr, Y, W, Mo, Ca, Mg, Li, Cr, Mn, Co, Ni, Cu, or Zn (paragraph 0033) in the amount of from 0.1 to 50% by weight, with particular preference from 1 to 10% by weight (paragraph 0041). Hennige et al. discloses the polyelectrolytes or polymers which carry fixed charges are sulfonated polytetrafluoroethylene, sulfonated polyvinylidene fluoride, aminolyzed polytetrafluoroethylene, aminolyzed polyvinylidene fluoride, sulfonated polysulfone, aminolyzed polysulfone, sulfonated polyether imide, aminolyzed polyether imide, sulfonated polyether ketone or polyether ether ketone, aminolyzed polyether ketone or polyether ether ketone, or a mixture thereof. The fraction of the polyelectrolytes or of the polymers which carry fixed charges in the melt or solution used is preferably from 0.001% by weight to 50% by weight, with particular preference from 0.01% to 25% (paragraph 0050).

Hennige et al. does not specifically disclose wherein the proton-conducting polymer is 100 parts by weight. It would have been obvious to one of ordinary skill in the art at the time of the invention to use 100 parts by weight to increase the amount of proton-conducting material present in the polymer membrane or make sure there is an optimal amount of proton-conducting material present to be able to efficiently conduct ions through the membrane, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. See MPEP 2144.05.

The phrase "inserted in metal phosphate layers" is functional language and imparts intended use to the structural features of the product. Therefore, while the claim language has been considered with regard to structure, the intended use language it is not given patentable weight because it is directed to a process and not directed to the structural features of the product. Winters et al. teaches a stack controller, a sensor input and a control output from the stack controller, which is the same structure claimed. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. See MPEP 2111. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. See MPEP 2113.

Response to Arguments

6. Applicant's arguments filed March 1, 2010, have been fully considered but they are not persuasive.

Applicant states that, Hennige discloses a porous and flexible ceramic membrane which is modified to have an ionic liquid in the pores. Applicant argues that, "Hennige does not teach or suggest the use of solid ion conductor wherein sulfoalkyl or sulfoaryl groups are inserted in (crystalline) metal phosphate layers".

This argument is not persuasive. First, it is unclear, as noted in the 35 U.S.C §112, second paragraph rejection above, if the "ionomer/solid proton conductor" is solely considered a solid material or if it can contain polymeric or liquid-type ionomer properties. As such, the claims of the instant invention do not limit the "sulfoalkyl or sulfoaryl groups" to being only solid materials. Second, the claim limitations do not state that the metal phosphate layers are "crystalline" and that the layers can not be layers of material which form pores.

Applicant argues that, "nowhere does Hennige teach or suggest sulfoalkyl or sulfoaryl groups inserted in metal phosphate layers where the metal is a Group IV metal, such as zirconium phosphate. The conventional materials of Hennige, e.g. phosphate, phosphide, phosphonate, etc., or a mixture with a metal such as Al, Si, P, Sn, etc. cannot form a layer structure."

This argument is not persuasive. Hennige teaches the use of phosphate, phosphide, phosphonate, etc., or a mixture with a metal such as Al, Si, P, Sn, etc. (which includes zirconium, to form zirconium phosphate). Applicant does not give any

proof or data to support the statement that "phosphate, phosphide, phosphonate, etc., or a mixture with a metal such as Al, Si, P, Sn, etc. cannot form a layer structure", and that they do not form a layer structure in Hennige.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill Apicella whose telephone number is (571) 272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795

Karie O'Neill Apicella
Examiner
Art Unit 1795

KOA